

Yieldcos

Analysis and Valuation

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1. Introduction

The renewable energy sector has been calling the attention of environmentalists and investors alike as current generations have become more aware of the environmental impacts of current consumption levels in developed countries. Although the moral reasoning behind the support for renewable energy projects is fairly straightforward; in practice, the act of investing and bringing these projects to fruition is more complex. On a USA baseline level, the failure rate of new renewable energy contracts has historically been between 30 and 40 percent.¹ A rate this high works as a deterrent for many risk averse investors who would not be willing to put their money into these projects. Although the financial and societal benefits of successful projects may be significant, the financial industry was poised to invent a new way to make renewable energy a safer investment.

1.1 Yieldcos

A Yieldco is a publically listed company that holds energy operating assets usually handed down to it by a parent company and pay out most of their earnings as dividends.² The core idea behind yieldcos is to put together a portfolio of already operating projects into a new subsidiary and sell the shares to the general public.³ This means that the projects that are still under development would remain separate, thereby mitigating the above mentioned high risk of failure of renewable projects. It is important to note that the yieldcos portfolio of projects are not exclusively renewable energy – many, like NRG Yield which will be the focus of the case study below, include conventional energy assets as well.⁴ Yieldcos are set up to earn predictable earnings for their shareholders due to the fact that many established energy plants have already signed power

¹ As reported by the California Energy Commission in their December 2011 report, available at <http://www.energy.ca.gov/2011publications/CEC-150-2011-002/CEC-150-2011-002-LCF-REV1.pdf>

² Nicholas Stone - NRG Nails IPO With Renewables (2013), Power Risk & Finance

³ Keith Martin – Yieldcos Compared (2013), Power Risk & Finance

⁴ See Appendix 1

purchase agreements (PPAs) with electricity providers. PPAs are contracts between electricity producers and power purchasers, such as electricity utility companies, that are used to set energy prices.⁵ NRG Yield's most recent acquisition of Alta Wind Energy is backed by a PPA with Southern California Edison for 21 years.⁶ This length of time is usually typical for PPAs and is used to further solidify the argument of the safety of ongoing cash flows for yieldcos for years to come. Therefore, not only are the projects owned by yieldcos already operational, they usually already provide secured cash flows for upwards of a decade.

Most yieldcos retain a right of first offer (ROFO) clause with their parent companies. Right of first offer (ROFO) clauses allow the yieldco the right to bid first on successful new projects developed by the parent.⁷ From the investor's standpoint, the risk of investing in renewable energies is significantly reduced through all these measures and yieldcos are thereby entitled to ask for premiums to be paid on their stocks. The benefits of yieldcos are further compounded by their ability to raise equity at closer to debt rates due to their predictable cash flows, and this appeal is increased by the fact that their model centers on distributing most of their earnings to shareholders through dividends.⁸ Lastly, the fact that yieldcos are publically listed companies also allows investors the benefit of trading their shares in a liquid market. All of these benefits put together make for a pretty compelling argument in favor of yieldcos.

1.2 The Beginning

The first sighting of a yieldco in the market was in July 2013 when NRG Energy created NRG Yield and listed the company under the NYLD ticker on NYSE. By the end of September 2013,

⁵ See http://ppp.worldbank.org/public-private-partnership/sector/energy/energy-power-agreements/power-purchase-agreements#key_features

⁶ See NRG Yield, Inc. to Acquire Largest Wind Farm in North America, available at <http://investor.nrgyield.com/phoenix.zhtml?c=251846&p=irol-newsArticle&id=1937203>

⁷ See Global X Funds, available at <http://www.globalxfunds.com/YLCO>

⁸ Idem 3

two more yieldcos, TransAtlanta Renewables and Pattern Energy Group, were listed on the Toronto Stock Exchange and NASDAQ, respectively.⁹ These three listings mark the introduction of yieldcos to the world. At the time, yieldcos were promoted as high dividend payout vehicles that mediate the risk of renewable energy investments. Almost two years later, yieldcos enjoy a much more familiar marketplace. The Global X Yieldco Exchange Trade Fund (ETF) was established in May 2015 to track the Global X Yieldco Index of top yieldcos (as determined by market cap) in the world.¹⁰ As of April 2015, the average dividend yield of these top yieldcos is 4%. The initial appeal of yieldcos to investors centered on the promise to distribute most of their earnings via dividends that would be maximized through, among other things, the use of accelerated depreciation, carrying forwards of net operating losses, and renewable energy tax credits.¹¹ The buzz around these companies was not only attributed to the favorable risk profiles as mentioned above, yieldcos also offered promising tax benefits.

1.3 Tax Benefits

In the US, the government has come up with a several different tax schemes that work to support renewable sector development. In particular, the Cash Grant Program was established in 2009 to provide a 30% tax credit to qualifying renewable energy projects.¹² In the world of yieldcos, this meant that parent companies had more incentive to invest in the development of new renewable projects, thereby indirectly benefiting yieldcos which had the potential of purchasing these projects later on, if they became operational. In case that a project was not eligible for the Cash Grant Program, the US government also offered the Production Tax Credit (PTC) for electricity

⁹ Idem 3

¹⁰ Interview with Bruno Del Alma (2015) - Yieldcos: The New MLPs?

¹¹ See Reese and Haughland (2015) - US Yieldcos Must Evolve to Survive

¹² Idem 11

generated from wind, geothermal, and closed-loop bioenergy.¹³ This tax credit offered a 2.3 cent per kWh subsidy for the first ten years of operation. Lastly, the Business Energy Investment Tax Credit (ITC) offered a 30% rebate on qualifying solar, fuel cell, and small wind operations and a 10% rebate on geothermal, microturbines, and combined heat and power.¹⁴ In addition to tax credits, the renewable industry is also supported by other schemes such as feed-in-tariffs, which usually allow grid access, long-term electricity contracts, and prices that are set based on renewable energy generation costs.¹⁵ All of these incentives, and more, span continents and the entire renewable energy industry. The favorable tax environment means a lot to yieldcos because of length of some of these tax benefits. Specifically, some the projects that are acquired are still within the tax protection time period. NRG Yield, when it was created in 2013, had a projection to operate in a tax free environment for 10 years.¹⁶ This length of time could then be further extended through the acquisition of new, but operating, renewable energy projects. This tax treatment means that distributions to shareholders are treated as returns on capital until the shareholders get their investment back, after which point they are reported as capital gains.¹⁷ All of these benefits mean that yieldcos are able to raise capital more cheaply. Lastly, this low cost of capital gives yieldcos better chances when bidding for new projects because the winning bid is usually the one with the lowest capital cost.¹⁸ In fact, it has been disputed that the cost of capital of some yieldcos is lower than that of their parent companies.

¹³ See Union of Concerned Scientists - Production Tax Credit for Renewable Energy, available at http://www.ucsusa.org/clean_energy/smart-energy-solutions/increase-renewables/production-tax-credit-for.html#.VII2yHbhdIU

¹⁴ See <http://energy.gov/savings/business-energy-investment-tax-credit-itc>

¹⁵ See KPMG's Taxes and Incentives for Renewable Energy, available at <https://www.kpmg.com/UA/en/IssuesAndInsights/ArticlesPublications/Documents/KPMG-ENR-Sustainability-Taxes-and-Incentives.pdf>

¹⁶ Idem 3

¹⁷ Idem 3

¹⁸ Idem 3

2. Criticism

As has been established in the preceding arguments, yieldcos offer a great deal of benefits to potential investors and they solve a pre-existing dilemma of funding in the renewable energy sector. However, like most things, they are not without their drawbacks. The yieldco model calls for continuing asset growth coupled with increasing distributions of cash as dividends.¹⁹ The reasoning behind this is that yieldcos promise to increase the dividends that they pay out as opposed to just keeping consistent yields. Specifically, in 2015 NRG Yield has promised to increase its annualized dividends by 15% through 2018.²⁰ In order to achieve this objective, yieldcos must have a steady pipeline of projects under development in order to benefit from higher cash flows, continuing tax benefits, and dividend growth.²¹ Since they do not develop new projects, they must fuel their growth through acquisitions. This acquired growth is a key tenet of the yieldcos model. In the recent economic environment which has been underpinned by low interest rates and favorable tax regimes, this duality has been successful. This environment has created the ability for acquisitions of new projects to be funded with outside capital and the net cash flow from these new assets usually exceeded the cost of capital.²² As mentioned above, this is exactly what yieldcos have been able to do with their ability to raise capital more cheaply. However, these factors are unlikely to be sustainable in the long term.

2.1 Rising Interest Rates

First of all, as the world economy strengthens, interest rates will rise. When this happens, companies will have to service the variable portion of their debt at higher rates. If yieldcos have

¹⁹ Idem 11

²⁰ See NRG Yield pledges to hit dividend targets through 2018 by Surran (2015), available at <http://seekingalpha.com/news/2788086-nrg-yield-pledges-to-hit-dividend-targets-through-2018>

²¹ See PwC perspectives on delivery of an independent YieldCo business (2014), available at <https://www.pwc.com/us/en/power-and-utilities/publications/assets/independent-yieldco-business-delivery-pwc.pdf>

²² Idem 11

to spend more money to service their debts, this means that there will be less money available for new acquisitions and dividend distributions.²³ In this way, both the tenets of the yieldco continuous growth model would be violated. Seeing as dividend growth works to protect a company's share price from rising interest rates, a decrease in dividends would result in a drop in share price.²⁴ On a comparison basis for investors, in the last few years, a dividend yield of 4% looked very attractive when compared to US 10 year treasury yield of around 2%.²⁵ However, if this number was to go up to 2007 numbers of around 5% - the yieldcos dividend yields would not look as appealing.²⁶ The use of treasury yields as a form of comparison is rooted in the assumption that yieldcos are appealing to risk averse investors. This is not universally true and will be explored below.

2.2 End of Tax Credits

The tax credits that have proven so beneficial for the growth of the renewable energy sector have or will be stopped or amended within the next few years. Firstly, the Cash Grant Program was only relevant for projects started by the end of 2011. Also, the PTC for wind projects expired at the end of 2014, and the ITC for solar projects will be reduced from 30% to 10% for commercial-scale projects, and eliminated entirely for residential solar installations at the end of 2016.²⁷ The situation is not much better in Europe. In the UK, the exemption of renewable electricity from the country's Climate Change Levy has been removed.²⁸ This means that the beneficial tax treatment has come to an end and is likely to result in a significant slowdown of new renewable projects being put into the pipeline. All this evidence shows a seemingly unenthusiastic climate brewing

²³ Idem 11

²⁴ See How Will Rising Interest Rates Impact Dividend Stocks? By Mauzy (2014), available at <http://www.wyattresearch.com/article/rising-interest-rates-impact-dividend-stocks/>

²⁵ See Yieldcos – Two Big Questions by McCrone and Liebreich (2015), available at <http://about.bnef.com/blog/mccrone-liebreich-yieldcos-two-big-questions/>

²⁶ See Appendix 2

²⁷ Idem 13

²⁸ Idem 25

for the renewable energy sector. As many of the tax credits cited as one of the main benefits of yieldcos slow down, and interest rates begin to grow, yieldcos could be at the forefront of a potential disaster for the industry. In fact, the excitement surrounding yieldcos that led the creation of Global X Yieldco ETF, has begun to slow down. Specifically, while the ETF started at 15.38 USD when it was first listed on NASDAQ in May 2015, by December 18, 2015, it had fallen to 10.57 USD (a decrease of 31.27%).²⁹

3. Analysis

The potentially uncertain future of yieldcos should be taken with a grain of salt. These instruments are very new, and they did fill a financial gap in the energy sector. Analysts state that in order for yieldcos to grow, they will need to evolve in several different ways. First of all, the potential of rising interest rates will have to be addressed by yieldcos managers in terms of concrete strategies that will be adopted to combat a higher interest rate environment.³⁰ This means that in order for investors to have continuing trust in the yieldcos model, they will need to see some long-term growth strategies. Secondly, while it is likely not disputed that yieldcos are unique instruments designed specifically for the renewable energy industry, it is important to note that there is significant variation in how they are understood and applied. Lastly, and perhaps most importantly, the market will have to decide on the proper way to value yieldcos.³¹

3.1 Geographical Differences

It is important to note that there are some geographical differences in yieldcos strategies. Namely, although American and Canadian yieldcos projects are mostly acquired by invoking the ROFO clause from their parent companies, many European yieldcos projects are acquired from third

²⁹ See Appendix 3

³⁰ Idem 25

³¹ Idem 25

parties.³² This means that the European yieldcos market is more competitive as it doesn't rely as strongly on parent company relations. Furthermore, in North America, yieldcos are viewed as growth stocks rather than a simple aggregation of projects. Investors' perception has been that, as they grow their acquisitions, they pay increasing levels of dividends per share.³³ In Europe however, yieldcos are seen as investments geared towards risk-averse investors. This simple difference in understanding of the purpose of these investment vehicles lends itself to different strategies in practice. Specifically, while North American yieldcos, such as NRG Yield, include conventional energy projects as part of their assets, European, primarily UK based, yieldcos stick to strictly renewable assets. Furthermore, not only do most UK based yieldcos, such as Foresight Solar Fund, Greencoat UK Wind, Bluefield Solar Income Fund, stick to renewables only, many of these yieldcos actually specialize in one type of renewable energy.³⁴ These differences, along with the variation in invoking the ROFO clause, are further compounded by a different type of behaviour in terms of debt between the two continents. While Foresight Solar has no asset-level borrowings and a fund-level leverage that is capped at 30% of gross assets, NRG Yield has debt that is equivalent to 70% of total assets.³⁵ While neither of these views are right or wrong, they do bring different valuation strategies to the forefront. Due to the specific nature of the business model that is focused on only operating projects coupled with high payout ratios, a second look at the way these funds are valued is warranted.

Any valuation of yieldcos should begin with an overview of historical performance. Since the existence of yieldcos is limited to a two year life-span, it is important to assess the instrument

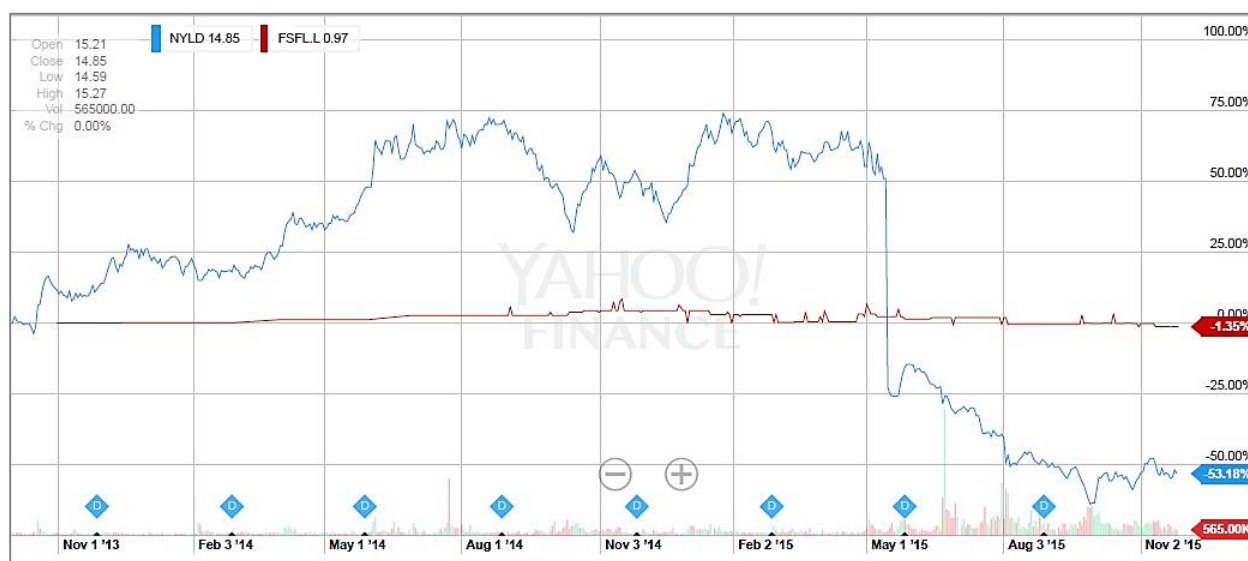
³² Idem 25

³³ Idem 25

³⁴ See <http://www.foresightgroup.eu/fsfl-home>, <http://www.greencoat-ukwind.com/about-us/who-we-are.aspx>, <http://www.bluefieldsif.com/>

³⁵ Idem 25 – Numbers based on June 2015

from a comparative standpoint. As mentioned above, the variations between European and North American yieldcos lend themselves to a good discussion. Therefore, this analysis will begin with an evaluation of the stock performance of two funds with similar lifespans but different geographical locations – namely, NRG Yield (NYLD) and Foresight Solar Fund (FSFL). As mentioned above, it is important to consider the fact that Foresight is a solar only fund while NRG Yield includes both renewable and conventional energy projects. However, their relative importance within their markets is what underpins them as choices for this analysis.³⁶ The previously mentioned strategic differences between European and North American yieldcos are supported by the following analysis of the relative performance of NYLD and FSFL.³⁷



As can be quickly gleaned from the comparative graph above, the differences in strategies between NRG Yield, and more representatively North American yieldcos, and Foresight Solar, and more representatively European yieldcos, have had clear impacts in the relative movements of their stock prices. Specifically, while these yieldcos were created within a few months of each

³⁶ Idem 25

³⁷ See <http://finance.yahoo.com/echarts?s=NYLD+Interactive>

other in 2013, Foresight Solar has managed to keep its stock price relatively stable over two years. It has traded within approximately 1-2% of its IPO price. Based on the logic outlined above, it can be seen that Foresight Solar follows its European counterparts with a share price that is representative of its net asset value, i.e. it does not trade at a premium.³⁸ Conversely, while the initial excitement around yieldcos in North America did cause NRG Yield's stock price to more than double close to a year after the IPO, recent (2015) performance has been well below the initial IPO price of \$22. The volatility of its performance can be credited to a couple different things. Although the high leverage could be pointed to as a risky strategy, it is important to note that the significant stock price drop in May 2015 is due to a stock split and the creation of NYLD.A ticker that represents class A common stock.³⁹ In the split, class C common stock was introduced as the new stock issued for funding. The strategy of the separation of two classes of shares was announced as an intention to not dilute current shareholders positions while allowing NRG Yield to continue to raise capital in the equity markets to fund its growth through the acquisition of assets. The two classes of shares move in an identical matter and therefore the current analysis will be focused on the NYLD ticker that will be viewed as representative of NRG Yield as a whole. Ignoring the stock split in May 2015, the examination of the behaviour previous to that paints the same picture of a high level of movements relative to Foresight Solar. The stock split does not change the fact that NRG Yield is representative of other North American yieldcos in its price movements and strategies. In particular, TransAlta Renewables, Pattern Energy Group, Abengoa Yield, NextEra Energy Partners, and TerraForm Power are all North American yieldcos that have

³⁸ See Appendix 4

³⁹ See NRG Yield, Inc. Sends Letter to NRG Yield Stockholders, available at <http://www.reuters.com/article/2015/04/13/nj-nrg-yield-idUSnBw135342a+100+BSW20150413#HJXGkgAB2AIF4iKc.97>

exhibited the same behaviour where they floated in 2013 and 2014 and have since varied greatly.⁴⁰ As of June 2015, the average share prices of these six yieldcos, including NRG Yield, had dipped by roughly 30%. The Foresight Solar Fund picture of stability presented above is further supported by similar movements of other UK based yieldcos such as Greencoat UK Wind, Bluefield Solar Income Fund, The Renewables Infrastructure Group, John Laing, Environmental Assets Group, and NextEnergy Solar Fund. On aggregate, these seven yieldcos have made average share price gains of about 6% in the same time period.⁴¹ As is evident by now, the unique nature of yieldcos missions to both continuously grow asset bases while providing ever increasing dividend growth is further complicated by separate geographical strategies. Aside from the volatility of stock performance, the portfolio makeup of North American funds including conventional energy resources contributes a new potential argument. Specifically, since the UK yieldcos mentioned above mostly specialize in one particular type of energy, all of them renewable, they remain less affected by global oil prices. Although an analysis of oil prices and their effect on yieldcos is beyond the scope of this report, it is important to note that NRG Yield in particular remains exposed to the volatility of oil prices as long as it retains conventional energy projects in its portfolio. Currently, their conventional assets make up 1,945 MW of the 3,948 MW of production in NRG Yield's portfolio.⁴²

3.2 MLP Comparison

Although the previous discussion has shed some light on the complications of choosing a valuation method best suited to yieldcos, strides have been made towards creating altered valuation methodologies that respect the variation between stocks and other financial vehicles. In particular,

⁴⁰ Idem 25

⁴¹ Idem 25

⁴² See NRG Project List, available at http://investor.nrgyield.com/phoenix.zhtml?c=251846&p=irol-projects_pf

comparisons have been made between yieldcos and Master Limited Partnerships (MLPs). The similarities between the two instruments begin with the fact that both investment vehicles are linked to energy assets (although MLPs also exist in the Real Estate industry) that generate income which is then passed through to investors.⁴³ Moreover, MLPs enjoy tax benefits that are similar but distinct from the ones that yieldcos have. Specifically, they tend to avoid both federal and state taxes in the US as long as they hold up to 90% of their assets in energy related industries.⁴⁴ Although the asset industry and tax treatment of yieldcos and MLPs appear to lend themselves to valuations that are identical, the similarities end there. As indicated above, while the asset base does vary between European and North American yieldcos, MLPs are strictly conventional energy pass-through vehicles. Additionally, they have been around for a while. The first MLP called Apache Oil Company was founded in 1981. The asset base of MLPs must be focused on oil, gas and petroleum products, coal, timber, ethanol, or biodiesel in order to qualify for the tax benefits.⁴⁵ Although this distinction doesn't entirely distance them from the North American yieldcos model, it almost completely separates MLPs from the European yieldcos funds. Furthermore, the reasoning behind the taxation shields is different. While yieldcos benefit from clean energy tax credits, feed-in tariffs, and avoidance of taxes due to carry-forwards of net operating losses, they are predominantly still corporations and eligible for taxation at that level. MLPs on the other hand benefit from a lack of taxation at the corporate level because they are considered partnerships. However, regardless of the reasoning behind the taxation advantages, both of these instruments benefit from the ability to raise capital more cheaply.⁴⁶ Nonetheless, an MLP style valuation would

⁴³ Idem 11

⁴⁴ See Mahn (2014) - What You Need To Know About MLPs And Investing In Energy, available at <http://www.forbes.com/sites/advisor/2014/09/30/what-you-need-to-know-about-mlps-and-investing-in-energy/>

⁴⁵ Idem 44

⁴⁶ Idem 3

not suffice in this situation mainly due to the differences between the conventional and renewable energy sectors. As mentioned previously, the motivation behind the creation of yieldcos was rooted in the desire to create investment vehicles that would alleviate the risk associated with renewable energy projects. As energy MLPs do not carry the same risk, this type of comparison would be insufficient in this analysis.

4. Case Study⁴⁷

The following valuation analysis will be focused on NRG Yield. As mentioned previously, NRG Yield was one of the first yieldcos when it emerged on NYSE, under the NYLD ticker, on July 17, 2013, with an issuance of 19.575 million shares at \$22.⁴⁸ By day end the shares were at trading at \$27.75. The initial asset portfolio consisted of three natural gas, eight utility-scale solar and wind facilities and two portfolios of distributed solar facilities.⁴⁹ This made up 1,324 MW of generation. The average weighted life of the power purchase agreements of these projects was 16 years.⁵⁰ With this type of setup the projected dividend yield was announced at 5.45%. This projection was adjusted down to 3.33% by December 2013, by which point the share price had escalated by 65%.⁵¹ It is important to note that NRG Energy, the parent company, retained majority voting interest but no economic interest. From the perspective of separation of risk that was listed as one of the main benefits of yieldcos, it would be interesting to evaluate what the effect of the separation of that many operating assets into a completely independent entity would do to the parent company's share price. Although the analysis of NRG Energy would make a good study, it is beyond the scope

⁴⁷ All calculations available on "Tamara Milacic – Thesis Model.xlsx" file

⁴⁸ See Stone (2013) - NRG Nails IPO With Renewables, available at <http://www.powerfinancerisk.com/Article/3233043/3474362/CommunityHome/The-Buzz-Yieldcos-Rush-To-Capital-Markets.html>

⁴⁹ Idem 48

⁵⁰ Idem 3

⁵¹ Idem 3

of this analysis. Nonetheless, it is interesting to compare the situation that arose during one NRG Yield's biggest purchases to date, the Alta Wind acquisition. At that point in mid-2014, NRG Energy had a significantly lower valuation relative to NRG Yield. At the time of this transaction, which was acquired from a third party, NRG Yield enjoyed an equity advantage over their parent company due to their stock being pegged at twice the EBITDA.⁵² This premium meant that NRG Yield was a better competitor for the project than their parent company due to their lower cost of equity. Although this raises the question of the impact of separating operating projects and retaining the risk of new and developing renewable projects, this question is best left to future examinations.

In regards to ownership structure, NRG Yield issued both class A and class B shares. Class B shares were reserved for their parent company while class A shares were issued as common stock to the public. This setup remained the same up until the stock split that created new class C common stock which now represent the NYLD ticker, as mentioned above. As is often the case, this stock split did result in about a 50% decrease in the share price of NRG Yield and a creation of the secondary NYLD.A ticker, but that instance will be overlooked in this analysis due to the following reasons. NRG Yield is still, as of November 2015, the third biggest member of the Global X Yieldco Index. As mentioned previously, this index is an adjusted market cap weighted index of the top 20 yieldcos in the world.⁵³ Due to the size of its market cap at \$948 million, the first mover advantage, and the availability of its financial information, it will be the focus of this analysis.

⁵² See Reynolds (2015) - A Peek into YieldCo's Relative Cost of Capital: An Analysis of a Recent Transaction, available at <https://financere.nrel.gov/finance/content/peek-yieldco-s-relative-cost-capital-analysis-recent-transaction>

⁵³ See Global X Yieldco Index, available at <http://www.indxx.com/yieldco.php>

4.1 Price to Distributable Cash Flow (PDCF)

In the decision to value NRG Yield, a couple of different methodologies stuck out. First of all, because of the comparisons that have been established with MLPs, and the similar Real Estate Investment Funds (REITs), it is logical to begin the methodology investigation there. Due to the unique nature of high dividend payouts, the traditional use of the price to earnings (PE) ratio is not as useful as the adjusted price to distributable cash flow ratio (PDCF).⁵⁴ The reasoning behind this is that both MLPs and yieldcos usually have very high depreciation charges because of a large amount of assets in their possession.⁵⁵ This depreciation eats into earnings, but not cash flow. The outcome of both the PE and PDCF is a multiplier that signals how expensive a company share is given the amount of earnings expected. Since yieldcos distribute most of their earnings, the cash available for distribution (CAFD) measure, which removes all non-cash items and is a metric reported on by yieldcos, is a better measure of the performance.

NRG YIELD - Yearly November 13th Price data	2013	2014	2015
CAFD (in millions USD)	91	103	165
CAFD (per share)	3.96	3.68	4.84
EPS	0.57	0.59	
Price (per share)	17.43	23.11	14.68
PE	30.58x	39.17x	40.35x⁵⁶
PDCF	4.41x	6.28x	3.03x
PDCF (NextEra Energy Partners LP)			2.08x

First off, it is important to note that the average PE ratio of the electric utility industry, that NRG Yield falls into, is 17.⁵⁷ Therefore, looking at the numbers above, the assumption would be that NRG Yield is currently at 2.37 times the average of the industry that it operates in. This measure makes NRG appear very expensive. However, as mentioned above, the PE is an inadequate

⁵⁴ See Gallon (2015) - Valuing MLPs: Price-to-Distributable Cash Flow Ratio, available at <http://marketrealist.com/2015/04/valuing-mlps-price-distributable-cash-flow-ratio/>

⁵⁵ See DiLallo (2015) - How to Value MLPs: Price to Distributable Cash Flow, available at <http://www.fool.com/investing/general/2015/02/08/how-to-value-mlps-price-to-distributable-cash-flow.aspx>

⁵⁶ See Appendix 5

⁵⁷ See Appendix 5

measure due to the unique nature of yieldcos and therefore the PDCF should be used. When looking at the PDCF ratio of 3.03, a much different picture is painted. This ratio seems much lower than that 40.35 PE ratio. However, in order to properly understand this measure it is useful to note the current PDCF of one of NRG Yield's competitors. NextEra Energy Partners LP is a limited partnership that was created by its parent NextEra Energy Inc. to manage North American energy projects that include wind, solar, and natural gas.⁵⁸ Just like NRG Yield, they are also included in the Global X Yieldco Index ETF top 10 holdings. Conversely to NRG Yield, they are a limited partnership but this only makes them more suitable for this PDCF analysis which was born out of the comparison to MLPs. Furthermore, the market cap of NRG Yield is 948M while the market cap of NextEra is 885M (numbers as of December 28, 2015). This means that these two yieldcos are fairly compatible for analysis. It seems that NextEra Energy Partners LP is a better buy due to their lower multiple of 2.08. This simple analysis is supported by the fact that NextEra was at a stock price of \$30.26 on December 28, 2015 (which is the date that the stock pricing was taken on for comparison sake) while NRG Yield was at \$14.91 on that same date. Although the PDCF ratio does paint a picture of the relative performance of yieldcos when compared to the market as well as when compared to each other, it is nonetheless a simplistic measure and must be supported by a more in depth analysis.

4.2 Alta Wind Valuation Model

Any portfolio valuation should begin with a valuation of the underlying assets in question. Although a full valuation of all the assets in NRG Yield's portfolio are beyond the scope of this analysis, the valuation of its Alta Wind facility, which was originally acquired in August 2014, will provide a basis for this investigation. The choice of Alta Wind was based on five tenets. First

⁵⁸ See Company Info – NextEra Energy LP, available at <http://www.investor.nexteraenergypartners.com/phoenix.zhtml?c=253465&p=irol-homeProfile&t=&id=&>

of all, the variation between European and North American yieldcos in terms of their generalist or renewable-only portfolios will be respected through the use of a wind farm for valuation. The use of a conventional energy project in this situation would be less likely to lend itself to further generalizable investigations of European yieldcos. Secondly, Alta Wind is 100% owned by NRG Yield and is therefore more suitable than partly-owned projects for simplification purposes. Furthermore, Alta Wind is second largest on shore wind farm in the world and the largest in North America.⁵⁹ Furthermore, as of September 30, 2015, Alta Wind comprises about a quarter of the total generation of the NRG Yield portfolio (947 out of 3,948MW).⁶⁰ Lastly, NRG Yield is continuing to go through many changes, even as this report is written, chief among them being the announcement of the 2016 split of all of its renewable assets into a new company called GreenCo.⁶¹ Although an examination of the effect and reasoning behind this spinoff are beyond the scope of this analysis, it will likely work to solidify the relevance and importance of the Alta Wind Farm, for both NRG Yield now, and the future GreenCo spinoff. An altered energy sector specific discounted cash flow model was used to analyse Alta Wind. Specifically, the same measures of NPV and IRR act as outputs for the determination of the investment decision, but the revenues, operating costs, generation, and capacity factors are tailored to the energy sector. The model was not used to generalize the valuation to NRG Yield but rather as a starting point in understanding renewable energy assets owned by yieldcos.

⁵⁹ Idem 6

⁶⁰ See Appendix 1

⁶¹ See Lacey (2015) - NRG Will Spin Off Its Clean Energy Business: Investor Pressure, or a Bet on a Green Premium?, available at <http://www.greentechmedia.com/articles/read/under-pressure-from-investors-nrg-restructures-clean-energy-business>

4.2.1 Inputs

First of all, the capacity and generation factors were calculated. The plant capacity is 947 MW, as mentioned above. In order to calculate the annual generation, this number was converted to MWh through the use of a capacity factor.

Project Inputs		
Plant Capacity	947	MW
Capacity Factor	32.76%	
Annual Generation	2,717,367	MWh

The capacity factor of 32.76% was generated by taking the average of the capacity factors of wind energy farms in the United States from January 2013 to August 2015. This data was obtained from the US Energy Information Administration (EIA).⁶² Next, seeing as the acquisition of the individual costs involved in Alta Wind PPA were unavailable, revenues were calculated using an estimation from the EIA as well.⁶³ Considering that the Alta Wind facility is an electricity plant located in California, the calculation of revenues came from taking wholesale prices for 2015 year to date. The idea behind this calculation was that electricity prices vary regionally across the US and an average of the whole country would be less accurate. Specifically, while the Southern California average wholesale price for 2015 is around 34.42 \$/MWh, the Northwest (Mid-Columbia) hub wholesale price was 26.34 \$/MWh.

Revenues	Electricity c/KWh
Average Tariff	3.44

Next, investment costs were calculated. At this point there was a choice between assuming the price of Alta to be the same as what NRG Yield paid for it in 2014 (870 million USD⁶⁴), or

⁶² See Capacity Factors for Utility Scale Generators Not Primarily Using Fossil Fuels, January 2013-September 2015, available at http://www.eia.gov/electricity/monthly/epm_table_grapher.cfm?t=epmt_6_07_b

⁶³ See Wholesale Electricity and Natural Gas Market Data (2015), available at <https://www.eia.gov/electricity/wholesale/#history>

⁶⁴ Idem 6

calculating it manually. The manual approach was chosen due to the assumption that the price requested for the purchase of Alta Wind would be the difference between their total assets and debt.

Investment Costs	USD
Assets Assumed	2,552,000,000
Debt Assumed	1,629,000,000
Purchase Cost	923,000,000

The difference between the amount of assets gained and the amount of debt assumed is 53 million higher than the price that NRG Yield paid. However, for valuation purposes it was assumed that this discount did not take place and that the price of acquisition was exactly the difference between assets and debt i.e. the net asset value. This value was also taken for validity purposes. Specifically, taking the NRG Yield purchase price would have to include the assumption that all of the situational factors directly related to NRG Yield acquiring this discount would be the exact same in different purchases of Alta by other parties. Since Alta was valued separate of NRG Yield in this case, the net asset value is more representative. Next, operating costs were estimated through the use of average costs for new generation resources. This data was also acquired from EIA.⁶⁵ It is important to note that this dataset is based on 2013 US dollars for wind projects that will be operational in 2020. Although this does not fully match the characteristics of Alta Wind which has been operational since 2014, it will undergo further upgrades and is intended to remain operational past the 2020 mark.

Operating Costs	\$/Mwh	USD
Operating and Maintenance	12.8	34,782,000
Transmission	3.1	8,424,000
Total		43,206,000

⁶⁵ See Annual Energy Outlook 2015, available at http://www.eia.gov/forecasts/aeo/electricity_generation.cfm

The costs were broken down into operating and maintenance and transmission costs. Transmission costs are the costs necessary to transfer the electricity from the wind farm to the end consumers. These costs were then multiplied by the annual generation to get a total of 43.2 million USD per year. The assumption that these costs may be higher than what is seen in the marketplace in 2015 was further verified through the use of a June 2010 report on The Cost and Performance of Distributed Wind Turbines, 2010-35.⁶⁶ Specifically, although the breakdown in the report included insurance and property taxes, the final total operating costs were 15.48 \$/MWh. Therefore, the original operating cost numbers were verified and taken as representative. Next, the weighted average cost of capital was calculated. The return on equity (ROE) input was taken from the industry average.⁶⁷ The ROE is a point of contention because, although the average of 301 utility companies was taken, the variation between them is very large. Some of the companies listed in the Sector analysis had an ROE as high as 1024% while others had it as low as -568%. NRG Yield in particular sat somewhere in the middle with a 2014 ROE of 2.602%. Additionally, the loan rate of 4.10% and loan term of 13 years used in the calculation of Weighted Average Cost of Capital (WACC) were taken as the averages of the debt outstanding by Alta Wind that were reported by NRG Yield following the acquisition.

Capital Structure	
ROE	9.30%
Loan Rate	4.10%
Loan Term (years)	13
Equity proportion	36%
WACC	5.2%

⁶⁶ Available at <http://www.eia.gov/analysis/studies/distribgen/system/pdf/full.pdf>

⁶⁷ See Appendix 5

This WACC of 5.2% was later used to discount cash flows of the project. Lastly, some additional assumptions were made regarding timing. Specifically, due to the extension of the model over many years, inflation was calculated in regards to both the average increase in electricity costs as well as increases in the consumer price index (CPI), which were used to calculate the escalation in operating costs from year to year.

Assumptions - Timing	
Electricity price inflation	4.15%
Inflation	2.36%
Corporate Tax rate	30%

The calculation of the electricity price inflation was acquired by taking the average growth in wholesale prices from 2002-2015 as this was the longest timespan available.⁶⁸ The CPI inflation was taken as an average of US inflation from 1999 to 2014 as this was the longest timespan available.⁶⁹ The electricity price inflation was used to increase yearly electricity costs in cents per KWh that started at 3.44 in 2015 (calculated above).

A couple of other assumptions were included in the determination of the model. The life cycle of wind farms has been widely accepted to stand at about 20-25 years.⁷⁰ However, recent research has shown that by 10 years of age the average load factor of UK wind farms declines by a third. Therefore, it was concluded that it is rarely economic to operate wind farms for more than 12 to 15 years. This research was specifically based on wind farms in Denmark and the UK. However, for the purposes of this analysis these numbers will be taken as representative due to the fact that this research did control for variation in wind speed and it is unlikely that there is a large difference

⁶⁸ Idem 66

⁶⁹ See Current US Inflation Rates: 2005-2015, available at <http://www.usinflationcalculator.com/inflation/current-inflation-rates/>

⁷⁰ See The Performance of Wind Farms in the United Kingdom and Denmark, available at <http://www.ref.org.uk/press-releases/281-wearnandntearnhitsnwindnfarmnoutputnandneconomicnlifetime>

in the design or performance of wind turbines in Europe and North America. Therefore, the length of time taken for the model was 15 years, starting from 2014 when Alta Wind began its operations. The choice of a shorter time length also lent to a more conservative model because the return for investors and governments alike is spread over a shorter time span. Consequently, terminal value was ignored due to the restricted timeframe. Lastly, since Alta Wind was constructed before the end of the PTC in 2014, the PTC was seen as applicable for the first ten years of operation. Since the PTC is a non-refundable tax credit, this means that the credit would not exceed the amount of taxes owed by Alta Wind in any given year. Specifically, if the 2.3 cents per KWh exceeded the tax liability of Alta Wind, the credit would stop at the exact amount of taxes owed.

4.2.2 Calculations

Under the scenario outlined in the inputs above, cash flows for Alta Wind were calculated. Operational costs were deducted from electricity generated revenues. Straight line depreciation with a period of 15 years was used for assets. Loan payments were calculated on the basis of the 4.10% interest rate, the 13 year average loan length, and the outstanding debt balance (1.629 billion USD). The standard corporate tax rate of 30% was applied yearly but due to operational losses and the PTC, tax liabilities did not exist. Additionally, equity cash flow was calculated by subtracting loan payments and tax from the operating cash flow. Lastly, debt coverage ratio (DCR) was included for the purposes of viewing the solvency during the operational life of the project. The average DCR over the span of 15 years was calculated to be 0.38.

4.2.3 Results

The purpose of the discounted cash flow model, including the adjusted energy version used in this analysis, is to help determine the potential viability of a project. Namely, whether the project is worth undertaking. This is illustrated through the use of two measures, net present value (NPV) and internal rate of return (IRR). First of all, NPV is used to determine the profitability of an

investment through the calculation of the difference between the present value of future cash inflows and outflows. As long as this number is positive, the project is considered to be a good investment. In the case of the Alta Wind valuation, the NPV came out to -145.2 million USD. Furthermore, the equity NPV that was calculated on the basis of ROE only (instead of WACC) and equity cash flows was positive at 88.7 million USD. Due to the negative NPV of the project, the conclusion would be that Alta Wind is not a profitable project to undertake. However, the internal rate of return was calculated to be 2.6%. This means that at the interest rate equal to 2.6%, all cash inflow and outflows would equal out to zero, i.e. it is the breakeven point at which the project neither costs money nor generates any. Thus, as long as the project can be financed for less than this percentage, it is considered a good investment. Therefore, if it is possible to finance the project at this rate, the NPV would be zero and a rational investor would be indifferent. Although this calculation seems to indicate that Alta Wind is not a good investment, several caveats of the valuation model need to be addressed.

5. Discussion

As with any financial model analysis, assumptions were made in the calculation of the viability of Alta Wind and need to be addressed. While a layperson might argue that the world's second largest wind farm is clearly a good investment, several limitations should be noted.

First of all, the use of only Alta Wind in this valuation comes with the limitation that a generalization cannot be made to the entire NRG Yield portfolio. This is partly due to the fact that NRG Yield includes conventional assets as well. An argument could be posed that this type of generalization would be more suited for European yieldcos that specialize in only wind energy. Furthermore, the results might have a further generalizability limitation to the rest of the yieldcos due to the large number of differences in yieldcos strategies, both geographically and locally.

Specifically, Greencoat UK Wind presents a good example of these differences. Although it is a UK based yieldco with a portfolio of only wind operating assets, a generalization from Alta Wind would be inappropriate due to the different taxation and regulatory framework in the UK, as well as the differences in strategy. As mentioned above, UK based yieldcos aim to secure dividend cash flows on a more stable basis and are viewed as secure investments as opposed to high growth vehicles. Furthermore, specifically relating to the model, the assumption of operational life of 15 years was used as a conservative measure and could be adjusted in further scenarios to produce more favorable outcomes if the Alta Wind farm ends up having a longer life. This might mean that the NPV would be positive if a different scenario was used. In addition, the dispute regarding operating and maintenance costs would lend to a good scenario analysis. If the costs were lower they might result in a positive NPV. Furthermore, if Alta was able to secure loans on the basis of its generation costs, as was available in the UK for a while, their costs might go down and result in a positive NPV.

Lastly, the use of IRR as a measure of the viability of the project is limited to projects that start with negative cash flows and then turn to positive. Any other setup renders the measure unusable and should therefore be taken with a grain of salt. Nonetheless, even with all these limitations, the above analysis provides a good starting ground for further research about yieldcos.

6. Conclusion

The determination of whether yieldcos are a renewable energy financial innovation or failure will depend on how several factors play out in the years to come. The caveats that still need to be addressed include strategies for combatting higher interest rate, choices between renewable only portfolios or inclusion of conventional energy, and most of all the valuation methods applied. Before these issues can be addressed a more uniform understanding of the goals of yieldcos need

to be understood. Due to the regional differences outlined above, addressing the valuation methods may have to come on a regional level. Specifically, the choice of NRG Yield to move towards a renewable only portfolio in 2016, with the creation of GreenCo, can be understood in two different ways. The move towards a more European yieldco style might signal that the North American high volatility model is unsustainable in the long term. Conversely, in the current era that is underpinned by importance of Kyoto Protocols and environmental standards, a move towards a greener strategy might be financially sound on its own. Specifically, as the prevalence and importance of renewable energies increases in the coming years, separating renewable projects from conventional energy might entice more environmentally conscious investors. Additionally, regulatory developments could work to further reward the renewable sector with closer ties being identified between the number of onshore wind farms and its effects on the government's emission targets. However, this is speculation that should be revisited in the coming years. What can be said with certainty now is that yieldcos have opened up a world of discussion regarding financial possibilities in the renewable energy sector. Further research should delve deeper into questions such as energy industry segregation and the financial consequences, both positive and negative, that would come from it. Regardless of the outcome of those measures, the future of the energy industry seems to lie in the correct interplay of science and finance.

7. Appendices

7.1 Appendix 1



http://investor.nrgyield.com/phoenix.zhtml?c=251846&p=irol-projects_pf

7.2 Appendix 2

10 Year Treasury Yield



7.3 Appendix 3

Global X Yieldco ETF (YLCO)



<https://uk.finance.yahoo.com/echarts?s=YLCO#symbol=YLCO;range=1d>

7.4 Appendix 4

Foresight Solar Fund

Key Statistics as at 31 March 2015	
No. of Ordinary Shares:	244,132,418
Ordinary Share Price:	102.50p
NAV:	£244.7m
NAV/Share as at 31 March 2015:	101.10p
Target Dividend per share (index-linked and annualised):	6.08p

<http://www.foresightgroup.eu/private-investors-and-advisers/foresight-solar-fund>

7.5 Appendix 5

Industry Metrics

Description	1-Day Price Chg %	Market Cap	P/E	ROE %	Div. Yield %	Debt to Equity	Price to Book	Net Profit Margin (mrq)
Sector: Utilities	-0.073	26608.51B	18.183	9.303	3.612	150.534	2.532	8.891
Industry: Electric Utilities	1.401	4742.93B	17	8.9	3.772	136.091	1.84	8.4
NRG Yield, Inc.	-4.05	1.22B	40.354	2.602	6.57	214.777	0.677	8.134

<http://biz.yahoo.com/p/911conameu.html#nyld>

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